

AUSTRALIAN ACANTHOCEPHALA, No. 1.

CENSUS OF RECORDED HOSTS AND PARASITES.

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Australian Acanthocephala have received very little attention. Dr. Sweet (1909, 498), in her census of the entozoa recorded from Australia, included only four, together with one from the Bismarck Archipelago. Of these four, two were merely mention of *Echinorhynchus* sp. from a porpoise and from a whip snake, both recorded by Krefft (1871); one relates to the presence of the common acanthocephalan from the pig in New South Wales; and the fourth, a species described by Linstow (1898) from material collected by Semon from a bandicoot in the Burnett River district, Queensland. The senior author added other records, using the wide generic term, *Echinorhynchus* sp. (1910-1912), besides describing a few new forms. More recently Southwell and Macfie (1925) described several new species. *Echinorhynchus pomatostomi* Johnston and Cleland (1911), frequently referred to in this census, is a widely distributed larval form occurring in many species of Australian birds.

The forms mentioned as occurring in Australian birds and reptiles to date were included in Johnston's census of recorded entozoa of those groups (1910, 1911, 1912); while those known to occur in Queensland were included in the census of endoparasites recorded from that State (Johnston 1916). Cleland (1922) listed those found in Australian birds and mentioned additional findings, and in 1916 made casual reference to Johnston's records of Acanthocephala from Australian rats.

A considerable mass of material is now on hand, representing collections made by Professor J. B. Cleland and the senior author, and it is proposed to take up the study more seriously, the present paper forming the first of a series which, it is hoped, will be continued as opportunity offers. In this census, the previous records, with few exceptions, are listed without comment, and a number of new ones are added. Synonymy of the host or parasite is introduced only where the recorder has referred to either under such name or names. The bird hosts are named and arranged in accordance with the "Official Check-list of Birds of Australia," Edit. 2, 1926.

MAMMALIA.

MARSUPIALIA.

ISOODON OBESULUS Shaw (syn. *Perameles obesulus*).

Gigantorhynchus semoni Linstow 1898, 471. Burnett R., Q'land.; Porta 1908, 276; 1909, 257. Originally described under *Echinorhynchus*, subgenus *Gigantorhynchus*. Travassos (1917, 25) transferred it to *Prosthenorchis* (sensu lato). Johnston recorded its presence in N.S. Wales (1909 c, 521).

PERAMELES NASUTA Geoffr.

Gigantorhynchus semoni Linst. Johnston 1910 c, XVII. as *Gigantorhynchus* sp.; 1911 a, 50. N.S. Wales.

PHASCOGALE PENICILLATA Shaw.

Gigantorhynchus sp. Johnston 1910 c, XVII.; 1911 a, 50. The host, "a brush-tailed rat," may possibly be *Bettongia penicillata* Gray.

RODENTIA.

MUS MUSCULUS L.

Moniliformis moniliformis Br. The record by Johnston (1909 a, 583, Sydney) is an error (Johnston 1918 a, 69).

RATTUS NORVEGICUS Erxl. (*Mus* or *Epimys decumanus*).

Moniliformis moniliformis Br. syn. *Gigantorhynchus moniliformis*; *Hormorhynchus moniliformis*. Johnston 1909 a, 583; 1909 b, 218; 1909 d, 81, N.S.W.; 1912 b, 83, Brisbane; 1913, 93, N. Q'land; 1918 a, 69, Sydney. Southwell and Macfie 1925, 171, N. Q'land; Fielding 1927, 124, N. Q'land. This parasite occurs in the grey rat in Adelaide.

RATTUS RATTUS L. and its variety ALEXANDRINUS. (*Mus* or *Epimys rattus* and *alexandrinus*).

Moniliformis moniliformis Br. Johnston 1909 a, 583; 1909 b, 218, 590; 1909 d, 81, N.S.W.; 1912 b, 83, Brisbane; 1918 a, 69, Sydney. Southwell and Macfie 1925, 171, N. Q'land; Fielding 1927, 124, N. Q'land. Occurs also in *R. rattus* in Adelaide.

RATS (unspecified).

Moniliformis moniliformis Br. Nicoll 1914, N. Q'land.

UNGULATA.

SUS SCROFA L. dom.

Macracanthorhynchus hirundinaceus Pall. (*Gigantorhynchus hirundinaceus*; *G. gigas*). Perrie (Agr. Gaz., N.S.W., 3, 1892, 822) N.S.W.; Johnston 1909 a, 583; 1909 d, 79, N.S.W.; 1918 b, 216 (S.E. Q'land). This parasite occurs at times in Victorian pigs slaughtered in Adelaide, but has not yet been detected in pigs bred in South Australia.

CETACEA.

DELPHINUS FORSTERI Gray.

Probably a synonym of *D. delphis* L. *Echinorhynchus* sp. Krefft 1871, 212 (Australian seas).

DELPHINUS DELPHIS L.

Corynosoma sp., resembling *C. strumosum* Rud., has been collected from this porpoise in Gulf St. Vincent, S. Aust.

WHALE—cast up on Bondi Beach, Sydney, N.S.W.

Bolbosoma porrigens Rud. nec Kaiser. Not previously recorded from Australian seas. The longest specimen measured 197 mm., which is much greater than the dimension usually met with. *B. porrigens* of Kaiser nec Rudolphi is, according to Luhe (1905), a synonym of *B. turbinella* Dies. which has been recorded from a whale from New Zealand. Through the courtesy of Dr. C. Anderson, Director of the Australian Museum, Sydney, and Mr. E. Troughton, the old registers of that institution were searched for a clue as to the probable identification of the whale. The only specimens likely to be concerned were those identified as *Kogia breviceps (grayi)* and *Megaptera longimana*, belonging to the Physteridae and Balaenidae respectively, both obtained in the vicinity of Bondi,

N.S.W. Since the parasite seems to be especially associated with species of the latter family, the host was probably *Megaptera nodosa* Bonnaterre (syn. *M. longimana* Rud.).

AVES.

GALLIFORMES.

ALECTURA LATHAMI Gray. (*Catheturus lathami*).

Echinorhynchus (*Gigantorhynchus*) sp. Johnston 1912 a, 106; 1912 b, 72; 1916, 45 S. Q'land. Probably a species of *Mediorhynchus* or *Empodius*, if the latter be generically distinct. Van Cleave (1924) unites them but Travassos (1924, 1926), as well as Southwell and Macfie (1925), consider them distinct.

TURNICIFORMES.

PEDIONOMUS TORQUATUS Gould.

Echinorhynchus pomatostomi Jnstr. and Clel.—a larval form identified from material collected at Ooldea, S.A.

CHARADRIIFORMES.

NUMENIUS CYANOPUS Vieill.

Arythmorhynchus sp. (syn. *Echinorhynchus* sp.) Johnston 1912 a, 107, Central Q'land; 1914 a, 110, N. Q'land.

ACCIPITRIFORMES.

ASTUR NOVAEHOLLANDIAE Gmelin (syns. *Astur clarus* Lath.; *A. cinereus* Vieill).

Centrorhynchus asturinus Johnston, originally described as *Gigantorhynchus asturinus* Johnston 1912 a, 108; 1913, 93; but later transferred to *Centrorhynchus* (1918 b, 215). Southwell and Macfie 1925, 164, N. Q'land. Travassos (1917, 28) included the species in *Gigantorhynchus* (sensu lato), and subsequently (1926, 44) under *Centrorhynchus*.

ASTUR FASCIATUS Vig. and Horsf. (syn. *A. approximans*).

Centrorhynchus asturinus Johnston, syn. *Echinorhynchus* sp. Johnston 1910, 100, N.S.W. Occurs in this species of hawk in Adelaide district, S. Austr. (Collected by Prof. Cleland.)

ACCIPITER CIRROCEPHALUS Vieill.

Centrorhynchus asturinus Johnston. Southwell and Macfie 1925, 163. Townsville. This parasite occurs in the same host species in N.S.W.

Centrorhynchus buteonis Gocze. Marval 1905, 24, no locality given.

BAZA SUBCRISTATA Gould.

Centrorhynchus asturinus Johnston 1918 b, 215. Richmond River, N.S.W.

Echinorhynchus bazae Southwell and Macfie 1925, 177, N. Q'land. Travassos (1926, 59) believes the species to be a *Prosthorhynchus*.

FALCO BERIGORA Vig. and Horsf., syn. *Hieracidea berigora*;
H. orientalis Sharpe.

Centrorhynchus asturinus Johnston, Southwell and Macfie 1925, 164, N. Q'land. It is now recorded as occurring in the brown hawk in N.S.W.

STRIGIFORMES.

NINOX BOOBOOK Lath.

Centrorhynchus sp. Johnston 1918 b, 216; syn. *Echinorhynchus* sp. Johnston 1912, 109. Burnett River, Q'land.

CORACIIFORMES.

EURYSTOMUS ORIENTALIS L. (syn. *E. pacificus* Lath.).

Echinorhynchus sp. Johnston 1912 a, 109, S. Q'land.

HALCYON SANCTUS Vig. and Horsf.

Echinorhynchus sp. Johnston 1910, 105, N.S.W. Probably identical with *E. horridus* Linstow (1897) from the sacred kingfisher from New Britain. Porta (1913) recorded it from *H. sanctus* from New Caledonia and Loyalty Islands, transferring it to *Chentrosoma*. Linstow's original material was re-described by Marval (1905, 284-6). Travassos (1926, 58) transferred the species to *Prosthorhynchus*.

CUCULIFORMES.

CENTROPUS PHASIANINUS Lath.

Echinorhynchus bulbocaudatus Southwell and Macfie 1925, 178, N. Q'land. Travassos (1926, 59) believes the species to belong to *Prosthorhynchus*.

MENURIFORMES.

MENURA NOVAEHOOLLANDIAE Lath. (syn. *M. superba* Davies).

Echinorhynchus menuræ Johnston 1912 b, 83, N.S.W. Travassos (1926, 58) placed the species under *Prosthorhynchus*.

PASSERIFORMES.

SEISURA INQUIETA Lath.

Acanthocephala found by Cleland 1922, 108. Canowindra, N.S.W.

PACHYCEPHALA INORNATA Gould (syn. *P. gilberti* Gould).

Echinorhynchus pomatostomi Jnstn. and Clel. 1911, 115, S. Austr.

GRALLINA CYANOLEUCA Lath. (syn. *G. picata* Lath.).

Echinorhynchus sp. Johnston 1912 a, 110; 1914, 110, N. Q'land.

PSOPHODES OLIVACEUS Lath. (syn. *P. crepitans* Lath.).

Echinorhynchus sp. Johnston 1910, 107, N.S.W. Acanthocephala found by Cleland (1922, 108), Bunya Mountains, S. Q'land.

CINCLOSOMA RUFIVENTRIS Gould.

Echinorhynchus pomatostomi Jnstn. and Clel., Port Lincoln, S. Austr. A new record.

CINCLOSOMA CASTANEUM Gould.

Echinorhynchus pomatostomi Jnstn. and Clel., Murray Flats, S. Austr. A new record.

CINCLOSOMA CINNAMONEUM Gould.

Echinorhynchus pomatostomi Jnstn. and Clel., larvae in subcutaneous tissues. Cleland 1922, 108, S. Austr.

POMATOSTOMUS TEMPORALIS Vig. and Horsf. (syn. *P. frivolus* Lath.).

Echinorhynchus pomatostomi Jnstn. and Clel., 1911, 112, N.S.W. Cleland 1922, 108, Canowindra, N.S.W.

POMATOSTOMUS RUBECULUS Gould.

Echinorhynchus pomatostomi Jnstn. and Clel., 1911, 111; syn. *Echinorhynchus* sp. Johnston 1910, N.-W. Austr.

POMATOSTOMUS SUPERCILIOSUS Vig. and Horsf.

Echinorhynchus pomatostomi Jnstn. and Clel. 1911, 112; syn. *Echinorhynchus* sp. Johnston 1910, 107, S. Austr. Cleland 1922, 108, Hallett's Cove, S. Austr.; Baradine, N.S.W.

POMATOSTOMUS RUFICEPS Hartlaub.

Echinorhynchus pomatostomi Jnstn. and Clel. Identified from material collected in the Gawler Ranges and also from the Murray River district, S. Austr. The latter occurrence is referred to by J. Sutton, S. Austr. Ornithol., 10, 1929, 33.

OREOCICHLA LUNULATA Lath.

Echinorhynchus sp. Johnston 1910, 108, N.S.W. (An adult form.)

Echinorhynchus pomatostomi Jnstn. and Clel. (larval). Cleland 1922, 108, Kuitpo, S. Austr. Acanthocephala were recorded by the latter author (1922) from Buna Mountains, Q'land.

APIHELOCEPHALA LEUCOPSIS Gould.

Echinorhynchus pomatostomi Jnstn. and Clel. 1911, 112 (syn. *Echinorhynchus* sp. Jnstn 1910, 109), S. Austr. Cleland 1922, 108, Hallett's Cove, S. Austr.

SERICORNIS MACULATUS Gould.

Echinorhynchus sp. (subcutaneous, probably *E. pomatostomi*), Port Lincoln, S. Austr., collected by Professor Cleland. A new record.

PYRRHOLAEMUS BRUNNEUS Gould.

Echinorhynchus pomatostomi, Jnstn. and Clel. Identified from material collected near Farina, S. Austr.

HYLACOLA PYRRHOPYGIA Vig. and Horsf.

Echinorhynchus pomatostomi Jnstn. and Clel. 1911, 112, S. Austr.

MEGALURUS GALACTOTES Temm.

Echinorhynchus cylindraceus Goeze. Marval 1905, 250. No locality given. The host is widely distributed in the more northerly portions of Australia. The parasite has a wide distribution outside of Australia, and has also been recorded from *Merulus* from the Loyalty Islands by Porta in 1913.

Travassos (1926, 41, 43, 58) has quoted Marval's *E. cylindraceus* as including two different species of *Centrorhynchus*, *C. cylindraceus* Goeze and *C. fasciatus* Westr., as well as *Prosthorhynchus dimorphocephalus* Westr. Marval also included *P. rectus* Linton, which Travassos regards as a valid species. In view of the confusion existing, a re-examination of Australasian material, attributed to Goeze's species, is desirable.

CLIMACTERIS PICUMNUS Temm. Syn. *C. scandens* Gould nec Temm.

Echinorhynchus pomatostomi Jnstn. and Clel. Mr. F. Parsons informs us that this larval parasite is very commonly found subcutaneously in this species of tree creeper in South Australia. Cleland 1922, 108, Morgan, S. Austr.

CLIMACTERIS LEUCOPHAEA Lath. Syn. *C. scandens* Temm. nec Gould.
Echinorhynchus pomatostomi Jnstn. and Clel. occurs occasionally in this species in South Australia (F. Parsons).

CLIMACTERIS WELLSI Grant.

Echinorhynchus pomatostomi Jnstn. and Clel, 1911, 111; syn. *Echinorhynchus* sp. Johnston 1910, 109, N.-W. Austr.

MELIORNIS NOVAEHOLLANDIAE Lath.

Echinorhynchus sp. Johnston 1910, 111, N.S.W.

CORCORAX MELANORHAMPHUS Vieill.

Echinorhynchus reported by Cleland 1922, 108, from Gunnedah and Belaringar, N.S.W.

REPTILIA.

LACERTILIA.

LYGOSOMA (HINULIA) QUOYI D. & B.

Echinorhynchus sp. Johnston 1909 c, XXIX., Hawkesbury R., N.S.W.

LYGOSOMA (HINULIA) TAENIOLATUM White.

Echinorhynchus sp. Johnston 1911 b, 243, Hawkesbury R., N.S.W.

DEMANSIA TEXTILIS D. & B. (syn. *Diemenia textilis*).

Echinorhynchus sp., encysted larvae below peritoncum, adults in intestine. Johnston 1910 c, XI.; 1910 b, 659; 1911 b, 237, Sydney, N.S.W.; encysted larvae — Johnston 1916, 59, Brisbane. Occurs also at Mount Lofty, S. Austr.

DEMANSIA PSAMMOPHIS Schl.

Echinorhynchus sp. Larvae below peritoneum. Brisbane, Q'land.

DEMANSIA PSAMMOPHIS, var. RETICULATA Kreff. (Syn. *Diemenia reticulata*.)

Echinorhynchus sp. Kreff 1871, 214, N.-W. Austr. Larvae in subperitoneal tissue, Johnston 1910 b, 659; 1911 b, 237. N.-W. Austr.

PSEUDECHIS PORPHYRIACUS Shaw.

Echinorhynchus rotundocapitatus Johnston 1912 b, 83, N.S.W. and Victoria; 1918 b, 216, S. Q'land; syn. *Echinorhynchus* sp. Johnston 1909 b, 590; 1911 b, 238, N.S.W. Occurs also in South Australia.

DIPSADOMORPHIUS FUSCUS Gray.

Echinorhynchus sp., encysted larvae, Johnston 1916, 59, Brisbane.

AMPHIBIA.

ANURA.

HYLA AUREA Lesson.

Echinorhynchus hylae Johnston 1914, 83; syn. *Echinorhynchus* sp. Johnston 1912, 84, Sydney. A larval form from cysts below peritoneum.

HYLA COERULEA White.

Echinorhynchus hylae Johnston 1914, 83, from cyst below peritoneum. Brisbane.

PISCES.

The arrangement followed is taken from MacCulloch's "Check list of the Fishes of N.S. Wales," 1922.

PERCOMORPHI.

TRACHURUS DECLIVIS Jenyns.

Echinorhynchus clavulus Duj. nec Hamann. Southwell and Macfie 1925, 179. Australia. As the specimen was collected by Dr. Maplestone on the same date as that on which he took *Acanthocephala* from another fish at Townsville, N. Q'land, the latter must have been the locality for the species thus identified.

POMADASYS HASTA Gunther.

Echinorhynchus truttae Schrank, was recorded from a "grunter" by Southwell and Macfie (1925, 180) from Townsville, N. Q'land. Since *P. hasta*, the javelin fish, is also called "grunter" locally, and was so indicated by Nicoll who investigated its trematode fauna, it may safely be assumed that this is the species referred to. The identification of this typical parasite of trout in a quite different type of fish which is tropical and subtropical in its distribution, seems to us very doubtful.

SPARUS AUSTRALIS Gunther.

Echinorhynchus sp. Nicoll 1914, N. Q'land. We have collected specimens from this "black bream" in the Brisbane River, S. Q'land.

SPARUS BERDA Forsk.

Echinorhynchus clavula Duj. nec Hamann. Southwell and Macfie 1925, 179. Townsville, N. Q'land.

Echinorhynchus truttae Schrank. Southwell and Macfie 1925, 180. No locality given, but apparently collected at Townsville, also.

We question the correctness of both of these identifications, and suggest the possibility of the host label having become misplaced (see under *Pomadasys*, also).

GIRELLA TRICUSPIDATA Q. & G. (Syn. *G. simplex* Richardson.)
Echinorhynchus sp. Johnston 1909 c, XXIX, Bondi, N.S.W.

THYRSITES ATUN Euphr.

Echinorhynchus sp. Johnston 1909 b, 710, Clarence River, N.S.W.

SCLEROPAREI.

CHELIDONICHTHYS KUMU Less and Garn.

Echinorhynchus sp. Johnston 1910 b, 660, Sydney, N.S.W.

PLATYCEPHALUS FUSCUS Cuv. and Val.

Echinorhynchus sp. Johnston 1910 b, 660, Sydney, N.S.W.

Serrasentis socialis Leidy. Southwell and Macfie (1925, 160) record the presence of larvae belonging to this species encysted in the body cavity of this flathead at Townsville, N. Q'land. The parasite is more widely known as *S. sagittifer* Linton. (See Van Cleave 1924, 326-8.)

UNKNOWN FISH, but probably the Tailor, *POMATOMUS SALTATRIX* L.

Serrasentis socialis Leidy. Adult specimens obtained by the senior author from a fish caught at Sydney, N.S.W.

"HADDOCK."

Echinorhynchus gadi Zoega. Southwell and Macfie 1925, 179, Townsville, N. Q'land. The haddock, *Gadus aeglefinus*, does not occur in Australia. Neither MacCulloch nor Waite, in their catalogues of the fishes of Queensland, New South Wales and South Australia, mentions the presence of any species of *Gadus* in Australian waters, though the family Gadidae is represented in the more southerly portions of the coast by *Lotella* and *Physiculus*. Gunther ("Study of Fishes," 1880) states that the genus *Gadus* is found in the arctic and temperate zones of the northern hemisphere. In view of these facts, it seems likely that the locality label must have become misplaced and that the record should be omitted from the Australian list.

HOST UNKNOWN.

Neoechinorhynchus magnus Southwell and Macfie 1925, 149, Townsville, N. Q'land. A short, unfigured account based on one immature female specimen. The genus occurs in fish and chelonians.

A number of errors regarding localities have appeared in Travassos' paper (1926). Those relating to Australasian records are as follows:—*Centrorhynchus zosteropis* (Porta) recorded as from Turkestan should be from New Caledonia and Loyalty Islands; *C. asturinus* Jnstn. from New Caledonia should be from Australia; *C. spinosus* (Kaiser) from Australia should be from Florida; *C. giganteus* Trav. from Australia should be from Brazil; *Centrorhynchus* sp. Jnstn. from *Ninox boobook*, mentioned as from Brazil, should be from Australia.

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